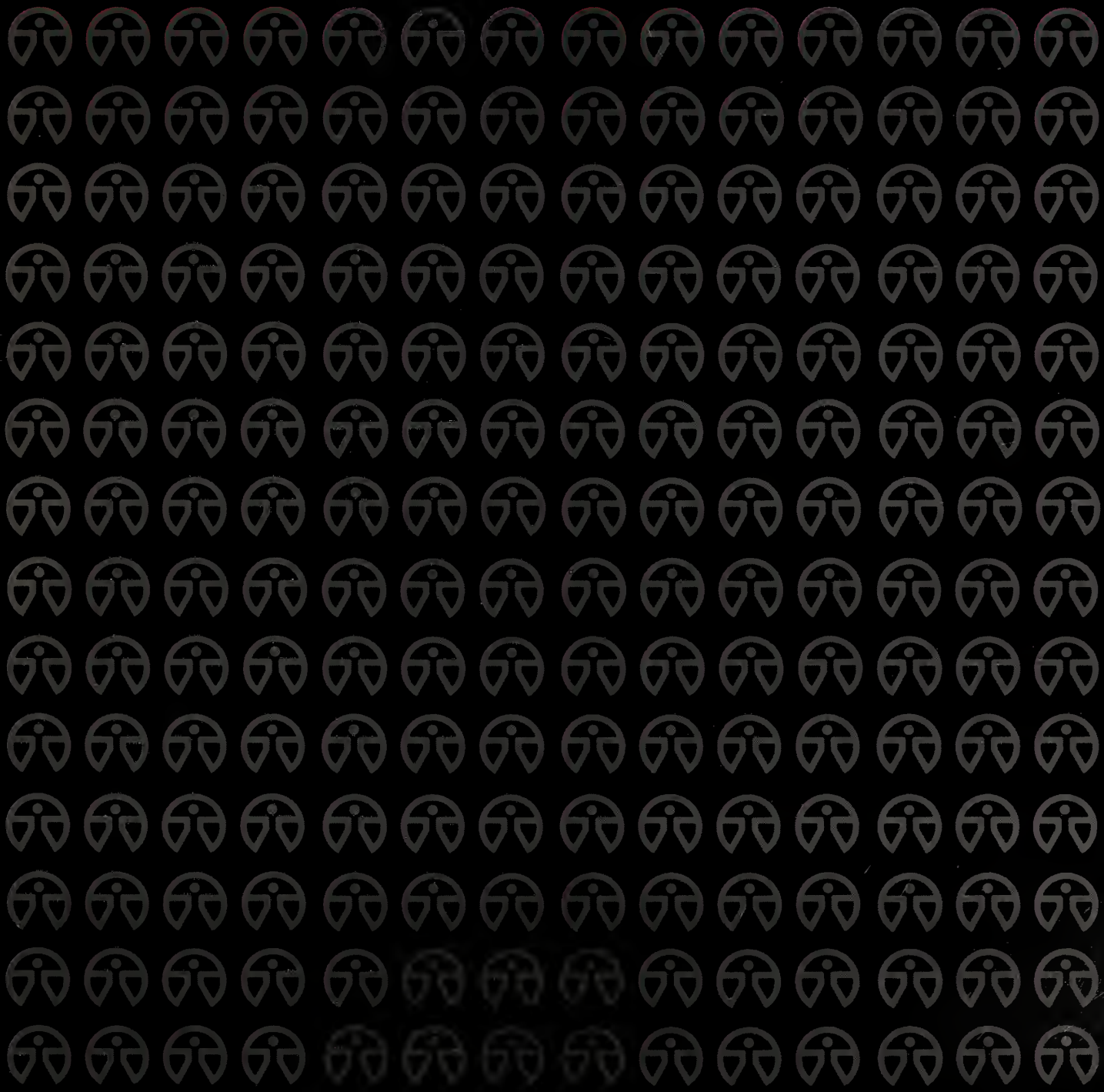
Warren Grant Magnuson Clinical Center

Annual Report 1985

National Institutes of Health



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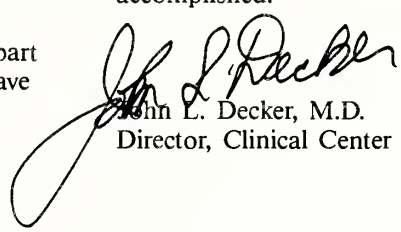
Foreword

The Warren Grant Magnuson Clinical Center is the world's largest hospital devoted exclusively to clinical research. In that role it is proud to have served the research needs of a host of biomedical scientists and physicians, to have assisted in providing the best medical care to patients who voluntarily made themselves a part of the enterprise and thus to have contributed to man's relentless search for health.

In this report we tell this year's Clinical Center story in a vein more informal than traditional, hoping to transmit some of the strain, the excitement, and the joy of working here. Our mission is unchanged and as challenging as ever. It will be accomplished.



John L. Decker, M.D.
Director, Clinical Center

Administrative Services

Equal Employment Opportunity Office

The Clinical Center EEO Office is responsible for providing staff support on all matters pertaining to Equal Employment Opportunity and affirmative action. The office also provides information and assistance to employees who feel that they have been discriminated against based on race, color, religion, age, sex, national origin, or handicapping condition.

In addition, the office manages the Summer Research Fellowship Program for medical and dental students. This program provides research experiences for those interested in pursuing careers in biomedical research, academic medicine or dentistry.

Even though hiring constraints precluded NIH from offering salaries to students during the summer of 1985, we were able to place 61 students in the intramural laboratories of their choice. This was accomplished primarily through support from non-appropriated Institute funds, grants from the Foundation for Advanced Education in the Sciences, Inc., and student support provided by their respective home institutions.

Hospital Administrative Officers

The Hospital Administrative Officers play an essential role in the daily operation of the patient care units. They oversee management problems large and small, plan and implement budgets for equipment and supplies, and coordinate renovations and upgrading of the patient areas. The Hospital Administrative Officers frequently serve on interdepartmental committees whose decisions have hospital-wide impact.

Specific projects for 1985 included:

- Service as project officers during the evaluation, selection, procurement and installation of monitoring equipment for 2 West, 3 East, 4 West, and 7 East.
- Conducting clinical trials, eliciting staff input, presenting product information to the Standardization Committee, and arranging for purchase of new hospital beds, mattresses, patient room furniture, vital sign monitors and other specialized clinical equipment.
- Developing and implementing clinical equipment repair resource system, and preventive maintenance program.
- Continuing implementation of Clinical Center art program in patient areas.
- Renovation of 12 West was completed and the unit was opened in September. This patient care unit consists of seven two-bed rooms and four laminar flow rooms.
- Renovation projects are currently underway on 10 West and 13 West with expected completion early in 1986. Other renovation projects include 5 East staff offices, 7 East exercise lab and conference room, and 9 East tub room.
- Continued upgrading of patient care units including painting, carpeting and installation of vinyl wall covering.

Office of the Associate Director For Medical Education

This office has a long list of responsibilities including oversight of medical and dental student training, graduate medical education, medical staff affairs, patient advocacy, recruitment of normal volunteers, and credentialing of medical staff members. The office also oversees the hospital's quality assurance program.

In 1985, this office revised the hospital's master quality assurance plan and further developed the Clinical Center's methods for reviewing untoward incidents involving patients. It also devised a plan to assure that all normal volunteers are fit to participate in research protocols.

Normal Volunteer Program

Normal volunteers, healthy individuals who are studied to provide scientists with data about normal body functions, have been an integral part of the research activities at the CC for many years. Since 1954, young adults—generally college students from all over the country—have been admitted as inpatients for up to three or four months to serve as normal control subjects for the clinical trials being carried out by researchers from the Institutes. This year, an estimated 90 young men and women from 15 colleges and universities throughout the U.S. participated in various long-term protocols. In addition to serving as normal controls, the students have the opportunity to work in one of the many laboratories at NIH, thereby giving them "hands on" experience in a modern biomedical research facility and providing a valuable adjunct to their academic studies.

However, the changing needs of researchers have resulted in a change in the Normal Volunteer Program. Currently, more of the studies using normal volunteers are short-term, and the participants generally come from the local community. Approximately 1,500 persons from the Washington metropolitan area make themselves available to researchers at the CC for outpatient studies.

During FY 1985, efforts to improve the program have been made in a number of areas. Volunteers are more carefully screened, area retirees have been recruited for studies requiring older volunteers, and a doctoral-level scientist was selected to head the program.

Patient Representative

A full-time Patient Representative provides information and assistance to patients and their families who have questions relating to hospital policies and procedures. The Patient Representative attempts to allay concerns, frustrations, and fears by explaining how this research hospital operates and by working with other staff members to address problems involving patients and families.

Medical Staff Fellowship Program

The Medical Staff Fellowship Program offers opportunities for training and experience in clinical and laboratory investigation to physicians, dentists, and pharmacologists who show evidence of professional achievement and interest in areas of research at NIH. They are selected and supported by the several Institutes.

In addition to the benefits of being in close contact with top-flight clinicians and scientists throughout all phases of their training, the many lectures,

tutorials, conferences and other educational activities available at NIH provide a wealth of information for staff fellows. This year, 89 new fellows were selected.

Clinical Elective Program

The NIH conducts a program of elective courses open to third and fourth year students from the nation's medical and dental schools. In-depth exposure to any of 16 clinical subspecialties is currently available through the collaboration of the staffs of the several Institutes. Students work closely with staff during their rotations. Tutorials in biological sciences may be arranged for them in a number of research laboratories.

This year, a total of 204 students from 81 U.S. medical and dental schools (and five foreign medical schools) received training in such diverse fields as surgical oncology and psychiatry, as well as geriatrics and computers in clinical medicine.

Office of Medical Staff Affairs

This office provides support to the director and Medical Board of the hospital on policies concerning patient care. This year's achievements included extensive revision of the Quality Assurance Program, revision of the Medical Staff Bylaws and improvements in the Incident Reporting System, the mechanism for guarding the safety of patients, employees and visitors here. Also, the office upgraded its method of certifying that health care workers at the CC are properly trained to care for their patients.

Office of Assistant for Bioethics

When ethical problems arise in patient care or research for physicians, nurses, patients or their families, consultation can be sought from the hospital's bioethicist.

The Assistant for Bioethics provides three services to help Clinical Center staff safeguard the highest ethical standards in clinical research and patient care. He assists the hospital director in second-level review of research to determine the suitability of experimentation with human subjects. He provides advice in troubling areas, such as how to care for terminally ill patients and how to obtain informed consent from patients. To that end, the office has developed a new policy on informed consent designed to protect the welfare of impaired patients. The bioethicist also teaches and does research on ethical issues.

In 1985, the bioethicist assisted the hospital director in the review of some 275 new research projects and about 450 continuing protocols. A postdoctoral fellowship in clinical bioethics at the Clinical Center is in the planning stage.

Office of Clinical Reports and Inquiries

Clinical Center public affairs activities are centered in the Office of Clinical Reports and Inquiries (OCR&I), familiarly known as the Information Office. The job of this office is to give information on Clinical Center patient care and research activities to the public—actually to many publics. We produce and publish information of value and interest to the general public, to Congress, to medical professionals, to prospective patients, and to students in the health sciences who may wish to receive training in a specialized field such as Blood Banking or Rehabilitation Medicine, or in research conducted by physicians in one of the Institutes. The office also publishes a monthly newsletter for CC employees, and patient education materials.

We are the focal point for media calls about patient care and clinical studies, and this has been an active year for requests from the media. Print and broadcast representatives have kept the office especially busy this year seeking print, television, and radio interviews with Clinical Center physicians to discuss AIDS. The major focus of interest has been on how the disease can and cannot be transmitted, and what is being done in research on possible new treatments. This year, we responded to more than 150 requests from the media for information or interviews on a broad range of topics.

We also answered approximately 3,500 calls and 400 letters from laymen, Congressmen and physicians seeking information about Clinical Center programs and general questions on disease, health care, and patient admission procedures. More than 250 referrals of patients were processed through this office.

A major outreach program of the Clinical Center is the highly successful "Medicine for the Layman" lecture series, now in its ninth year. In these talks, NIH scientists discuss diagnosis, treatment, prevention, and research on diseases and describe new technologies in medicine. Past lectures have dealt with heart attacks, obesity, cancer, depression, epilepsy, pain, and other common problems. Many of the talks are developed into booklets and videotapes that are distributed nationwide. Two new booklets were added to this popular series this year, "Behavior Patterns and Health," and "Herpes." The fall 1984 series—which included lectures on such topics as AIDS, child psychiatry, and hearing impairments—was videotaped for television broadcast around the country on Hospital Satellite Network.

Also this year, the Clinical Center was represented at the HealthCare Expo '85 held at the D.C. Convention Center in August. Three exhibits focused on the Clinical Center in general, the medical/professional training programs offered here, and the Medicine for the Layman series.

OCR&I's Television Engineering Section supports Institute research by recording and then making available tapes of certain diagnostic procedures and patient interviews. These recordings provide data for diagnosis, treatment, and research on diseases such as epilepsy, manic depressive illness, heart disease, and sleep deprivation. The section uses specialized video equipment to measure data from some of these recordings for investigators. TV Engineering also broadcasts daily seven and a half hours of patient programming and produces training tapes for Clinical Center patients and staff. The section is, however, in a period of gradual phaseout. Editing, recording and specialized equipment functions have been transferred to another NIH unit. Other functions will continue until phaseout is completed in FY 86.

The Special Events Section of OCR&I plans, coordinates and directs specific programs for visitors to the NIH. During 1985, this office was responsible for arranging programs for 1,586 visitors, including programs for 458 foreign guests representing 45 different countries. In addition, the Special Events staff consulted, planned and provided assistance for 1,016 scientific, administrative and cultural programs held in the Jack Masur Auditorium and ACRF Amphitheater.

Office of Management Support Services

The mission of the Office of Management Support Services (OMSS) is to formulate a budget for the hospital and to manage the number and type of employees who work at the Clinical Center.

The hospital's FY 1985 operating budget was $107,778,000. During the course of the year, the office prepared and defended budgets for FY 1986 (an estimated $108,004,000) and FY 1987 (an estimated $112,271,000).

Personnel actions processed this year (hiring, raises and promotions, as well as their negative counterparts) increased approximately 35% over FY 1984.

In addition to carrying out routine personnel activities, the office upgraded several classes of positions including pharmacists and the special Blood Bank program, completed a special pay survey of selected technical occupations, and submitted two legislative proposals to rectify pay disparities. Of particular note was the implementation of the nursing clinical ladder, a project supported by OMSS and approved by the Office of Personnel Management in late 1984. This resulted in the upgrading of more than 200 nurses in the Nursing Department.

The Educational Services Office overhauled and completely revised the hospital's employee orientation program and established a new program called the "Supervisory Seminar Series," which is a monthly series of seminars on a variety of topics of interest to hospital supervisors.

Safety Committee

The Clinical Center Safety Committee was established to help prevent personal injury, occupational disease, and damage to property through accidents or fire. It is a medium to exchange safety information, share resources, develop and implement corrective measures for deficiencies, conduct training and advise the hospital director.

During the past year, the Safety Committee implemented a multidisciplinary team approach to surveying patient care areas annually for hazardous conditions. The first survey resulted in immediate improvements in virtually all patient care areas.

Review of plans for new construction and renovation—two constants in Clinical Center life these days—involved much of the committee's time this year. Significant progress was made also this year in emergency planning and training. For the first time, the hospital successfully conducted a major external disaster drill during usual work hours. An "after hours" exercise is currently planned.

A bit further afield, CC staff belonging to the Disaster Medical Assistance Team received unique emergency medical care field training at a series of mock disaster exercises held in Maryland, Virginia and California. Knowledge gained in these exercises will be of value to the Clinical Center in our emergency preparedness program.

Medical Services

Anesthesia Section

The Anesthesia Section, a division of the Georgetown University Department of Anesthesia, provides appropriate anesthesia support and clinical care for patients undergoing surgery at the Clinical Center.

During 1985, the section provided anesthesia and supportive services in 2,090 instances, 176 of which were emergencies. Of these procedures, 160 were open heart operations. This volume of cases represents a 2.6% increase over last year.

In addition to clinical anesthesia services, the recovery room is also operated by the Anesthesia Section. During the past 12 months, the recovery room cared for 1,206 patients, of which 210 were outpatients. With the recent extension of services in the surgical clinic to include outpatient surgical cases under general and local/standby anesthesia, the recovery room has increased services available to include recovery of these patients. Patient education materials have also been revised to prepare these patients for procedures.

This past year, we began a study on patient-controlled analgesia (PCA) for post-cardiac surgery patients. This new therapy is emerging as a promising technique for administering narcotics for post-operative pain control. By using an electronic delivery system complete with a timer and syringe pump, a patient can intravenously deliver on demand a preset amount of pain medication. The patient activates the pump by pressing a button at the bedside. The syringe, locked in a case, connects directly to the patient's intravenous line. When a patient pushes the button, medication is released into the bloodstream for immediate pain relief.

Patients are taught to strive for good pain relief, but minimal drowsiness or sedation. The amount of pain medication delivered is predetermined at a dose felt to be safe by the physician. This dose can easily be adjusted by the physician after evaluating the patient's response.

Patients vary greatly in terms of their narcotic requirements for pain relief. One patient may need very little pain medicine during the hospital stay while another may require a fairly large amount, even though both patients had the same type of surgery. With PCA, a patient can administer pain medication as he or she feels it best controls pain. Some patients will administer medication immediately upon sensing the onset of discomfort, whereas others choose to wait and allow the pain to build up a little. Some patients strive for entire pain relief, while others choose to eliminate most but not all of their pain.

More than 3,000 patients have used PCA for postoperative pain relief. There are several FDA-approved machines available to deliver PCA. Drug dependence and narcotic misuse have been addressed in studies, and no addiction potential has been seen in patients without a history of addiction. Various studies at NIH are projected for the future using PCA.

Clinical Pathology Department

Truly large numbers were invented for relatively few and august reasons—Avogadro's number, the number of hits Pete Rose will get before he finally retires, and the number of tests performed each year in the Clinical Pathology Department. This year, the department performed 3.4 million laboratory tests, a modest increase from the year before. These tests, vitally important to the work of the hospital, were done by the five services that compose Clinical Pathology.

Chemistry Service

The Clinical Chemistry Service performed 1.94 million tests in 1985. This service continued to improve the quality of its test results and service in the past year by upgrading procedures, instrumentation and operating policies. The latest generation of high-volume chemistry analyzer was introduced into daily use, along with a new single test analyzer serving as both companion and backup to the main analyzer. Our therapeutic drug monitoring service was expanded to include four new drugs. Initial steps were taken in a project intended to automate and computerize routine urinalysis to provide greater efficiency in the laboratory and a more rapid turnaround of urinalysis results.

Research activities in the Clinical Chemistry Service continue in a number of areas. High resolution electrophoretic systems are being applied to the study of proteins and lipoproteins in neurological diseases, lipoprotein abnormalities, AIDS, and autoimmune disease. The role of ascorbic acid in adrenal cortex metabolism has been studied. Methodological interferences in laboratory tests by hemoglobin, ascorbic acid, bilirubin, and cephalosporin antibiotics were defined. A long-term study of magnesium has examined binding to proteins, intracellular concentrations, and its relationship to parathyroid hormone.

Hematology Service

The Hematology Service performed 1.14 million tests in 1985. This service interpreted 1,941 bone marrows from Clinical Center patients and 175 bone marrows received in consultation from outside the NIH. The senior staff consulted on approximately 600 patients in the CC with general medical and hematologic problems. The flow cytometer and cell sorter in the service were expanded to evaluate not only B and T lymphocyte populations but also to identify surface markers of platelet populations. The Hematology Service has developed its own monoclonal antibody panel for recognition of surface markers on platelets. During the past year, the service evaluated two new automated hematology systems and a semi-automated differential counter. At the end of this evaluation, we decided to select an automated system that could perform 60 complete blood counts and differentials per hour. New assays were developed for ferritin, glycosylated hemoglobin, and terminal deoxynucleotide.

We found that a variant form of von Willebrand's disease, type IIa, has a structurally abnormal plasma von Willebrand factor. This allows for insights into the cause of von Willebrand's disease and ways to modify the von Willebrand factor.

Immunology Service

During FY 1985, the Immunology Service markedly expanded the laboratory tests provided for the clinical care of patients. New tests being offered include: C3, C4, IgE, anti-double stranded DNA antibody, anti-Sm antibody, and CSF IgG index. In addition, methods for certain tests have been changed to improve efficiency and information provided. Plans for the future include additional testing in the areas of serology, specific antibody levels, and lymphocyte phenotyping with a goal of creating a "state-of-the-art" clinical immunology laboratory.

Critical Care Medicine Department

Microbiology Service

The Microbiology Service performed 195,000 tests in 1985. A number of new procedures have been implemented by the service this year. A cytocentrifuge is now used for concentration of sterile fluid specimens for Gram smear. This results in good preservation and concentration of organisms. Several rapid and inexpensive enzymatic tests have been evaluated and put into use. New methods for the identification of problem organisms, particularly the non-fermenting Gram negative rods, have also been introduced.

Methods and instruments were evaluated for the more rapid identification of organisms. We evaluated two instruments capable of the identification of bacteria, determination of susceptibility to antibiotics, and direct data transfer to the laboratory information system.

Phlebotomy Service

A central accessioning and processing unit for laboratory specimens was effectively established by this service. Previously, this function had been performed by each clinical service. The Phlebotomy Service is now responsible for all specimen handling up to the time of analysis.

Clinical Center patients often have serious, life-threatening problems—particularly those involving multiple organ systems—that require the special skills of critical care physicians, as well as considerable time and attention from specially trained nurses and technical personnel.

During 1985, the department admitted 381 patients for 1,579 days of intensive care. An additional 202 patients were admitted for short-term stays in order to perform invasive procedures such as bronchoscopy, heart biopsy, right heart catheterization to evaluate volume status, or central line placements for intravenous infusions. Our patients came principally from the National Cancer Institute (49%), the National Institute of Allergy and Infectious Diseases (25%), and the National Heart, Lung, and Blood Institute (23%). However, users of the intensive care unit (ICU) or of department consultative services were found in each of the other institutes. Respiratory therapy services were provided to 553 patients outside of the ICU, and hemodynamic monitoring was provided to 1,681 patients outside the ICU. Patient care activity, the primary responsibility and the primary focus of our department, has become increasingly busy during the past five years. The number of patient admissions has increased by 145% compared to 1982 and by 23% compared to 1984.

The Critical Care Medicine Department has received national recognition for its leadership in the field of critical care, particularly in the area of helping patients whose immune systems are suppressed. This leadership has been recognized in several ways: the department is able to select candidates for its training program from a very large pool of skilled young physicians; the Society of Critical Care Medicine has asked the department to present several symposia on the care of immunosuppressed patients at its annual meeting; and multiple research articles from department members have been accepted by prominent journals.

Research in the area of immunosuppression, particularly significant in 1985, has focused on septic shock, acquired immunodeficiency syndrome (AIDS), and cardiomyopathy. In our Medical Intensive Care Unit on 10D, we have used sophisticated cardiovascular monitoring techniques at the bedside to show that a substantial number of septic shock patients develop a profound but transient decrease in heart function. This myocardial dysfunction results from a circulating myocardial depressant substance that several investigators are now working to isolate.

Studies of pneumocystis, cytomegalovirus, and cryptococcus have provided new insights into the infectious complications of AIDS and have identified promising new therapeutic possibilities for patients infected with these pathogens. Patients with severe heart failure due to dilated cardiomyopathy are being studied with biopsies to determine the possibility of an inflammatory pathogenesis. A randomized trial of anti-inflammatory therapy is in progress.

In summary, this has been a year of providing increased clinical service to the Institutes admitting patients and a year of increasing national recognition for the quality and productivity of the department's clinical care and research activities. We expect to continue to provide leadership during the formative years of the newly recognized medical subspecialty of critical care medicine.

Diagnostic Radiology Department

During the past year, the Diagnostic Radiology Department has been adjusting to the presence in the center of its offices of an extraordinarily strong magnet that erases credit cards, freezes watches, and makes missiles out of ordinarily harmless items like nearby paper clips.

The magnet is the basis of a new imaging technique known as Magnetic Resonance Imaging (MRI), which is revolutionizing the diagnosis of human diseases. But it is also introducing some very sticky problems into the everyday activities of the department.

The theory behind MRI is based on the presence in our bodies of a vast number of protons or hydrogen nuclei which behave like tiny bar magnets. Although randomly distributed under normal circumstances, these protons line up parallel to the north and south poles when subjected to a strong magnetic field. This field, equivalent to 5,000 gauss, approaches in strength the magnets used in junkyards for lifting scrap metal. To attain such field strength using a conventional electromagnet would cost thousands of dollars yearly in electrical bills and generate enough heat to make the department unbearable in a typical Washington summer. Consequently, the magnet functions at a temperature near absolute zero where the flow of electricity encounters almost no resistance and therefore generates almost no heat. These temperatures are achieved by encasing the magnet in liquid nitrogen and helium. Consequently, it continuously emits puffs of smoke, like a sleeping volcano.

Patients in the magnet experience no sensation in spite of realignment of their protons. Strong radio frequency impulses are then used to deflect these protons and, as they realign along the lines of the magnetic field, they emit tiny radiofrequencies which are detected and recorded. Using a technique similar to the more familiar CAT scanning, computers generate an image based on the concentration of protons throughout the body.

This new imaging modality has a number of unique features. It can produce images of the body in multiple planes—not just the familiar cross sections of CAT scanning but full view in the frontal and lateral planes. Since exposure to high magnetic fields is, to the best of our knowledge, completely harmless, many patients previously deprived of diagnostic radiation procedures because of risk (such as pregnant women and the unborn fetus) can now be examined. Imaging times are long—up to two hours—and considerable energy is expended both coaxing patients into the machine (it resem-

bles being delivered into the barrel of a cannon) and convincing them to remain there nearly motionless for the duration of the examination. Care must also be exercised in selecting patients since the strong magnetic field shuts off cardiac pacemakers. Also, it is important to protect patients from the missile effect when magnetic foreign bodies are carelessly handled in the vicinity of the magnet and get sucked in like little bullets.

Is it worth it? Preliminary experience suggests the proper answer is a resounding, "Yes!" There are a number of important diseases in which MRI provides information not previously available. For example, MRI can detect the presence of white matter involvement in the brain, the so-called demyelinating syndromes (the best known of which is multiple sclerosis) long before any other diagnostic test. In the past, such a diagnosis was one of exclusion; patients and their families often waited for months before the diagnosis was definitely established. MRI visualizes the early plaques of multiple sclerosis long before any other imaging technique.

By virtue of its ability to look through bone without interference, MRI is the optimum technique for viewing the spinal cord and its surroundings. In practical terms, it is a noninvasive myelogram and is particularly effective in the diagnosis of ruptured intervertebral discs and low back syndromes.

Because flowing blood moves in the magnetic field so rapidly, it emits no signal. Therefore, blood vessels and chambers of the heart are seen as if totally empty and the anatomy of vascular occlusions, aneurysms and thromboses is clearly depicted. More important, MRI shows the interior of the cardiac chambers, as well as the muscle of the heart wall, enabling one to detect at an early stage various cardiomyopathies or diseases of the heart muscle. Cardiac infarcts due to coronary occlusions can be imaged as areas of abnormal water accumulation (edema) since water consists mostly of the little hydrogen magnets.

So, for all the inconvenience entailed, the promise of MRI is immense and its exploration exhilarating. Who cares if the information on one's credit card is accidentally erased?

In addition to research centered around MRI, the Diagnostic Radiology Department has a major study involving the use of ultrasound to make specific diagnoses. Until now, ultrasonic imaging depended upon reflected sound waves, much like radar, to display internal structures. Certain tissues produce more echoes than others. Although this allowed us to image organs and masses, very little was understood about the basis for these diverse reflective properties. With large complex computers, we are beginning to analyze the immense amount of information available from these reflected sound waves with the prospect that specific organs and even diseases in these organs will be associated with a characteristic reflection, called a "tissue signature." If it succeeds, ultrasound, like MRI, will become a harmless, noninvasive technique for further exploration of disease processes.

However, all of our activities have not been directed toward new imaging techniques. A major program involves the treatment of brain tumors by an isolated chemotherapeutic perfusion of the brain. The vessels within the skull are cannulated by one of several highly maneuverable catheters that have been developed in conjunction with researchers in the Biomedical Engineering and Instrumentation Branch. One model, called the toposcopic catheter, continuously unfolds or everts itself, passing

around multiple curves to achieve a position proximal to the target tumor. The mechanism can be likened to removing one's sock by turning it inside out. Another catheter has minute lateral jets that help to propel the catheter forward in the blood vessel and, when activated on one side, help to deflect it into selected branches. Both of these catheters have been used to deposit chemotherapeutic agents very close to brain tumors. This proximity, plus the ability to remove from the jugular vein chemotherapeutic agent not absorbed by the tumor, has permitted us to administer doses previously considered toxic. In a very real sense, we are administering fatal doses of chemotherapy to the brain tumor but removing the unused chemotherapeutic agent from the jugular vein before it reaches the rest of the body and has an adverse effect. This treatment has been directed principally toward brain tumors for which there is no acceptable therapy at present. Encouraging remissions of certain tumors have been achieved.

To sum up the year, we performed a total of 74,230 X-ray examinations, up 5% from 1984. Special Procedures were stable at 955 examinations, but both CAT (11,138 exams) and ultrasound (3,101) increased by 12%. Magnetic Resonance Imaging, our latest acquisition, was performed on 1,284 patients during the past year.

Hospital Epidemiology Service

The Clinical Center's Hospital Epidemiology Service (HES) is charged with monitoring the occurrence of nosocomial (hospital acquired) infections; it investigates clusters or outbreaks of such infections, and works out policies and procedures to prevent their occurrence. The service also educates staff and patients at the CC regarding prevention of nosocomial infection, and conducts research into the epidemiology, pathogenesis and prevention of nosocomial infection. During the past year, the department was kept busy in responding to patient and staff concerns about patients with Acquired Immunodeficiency Syndrome (AIDS).

Initially, little was known about AIDS, and the HES focused on disseminating the most current epidemiologic information (data on incidence and distribution), emphasizing the similarities of the epidemiology of AIDS to that of hepatitis B. In order to minimize the potential for the nosocomial transmission of AIDS, we developed isolation precautions specifically designed to eliminate exposure of health care workers to blood or body fluids from these patients. We conducted numerous educational sessions, both formally and informally, for virtually every CC department. All CC employees, from the medical staff to the housekeeping personnel, were made aware of the presence of AIDS patients in the CC, given accurate, up-to-date information about the disease and its epidemiology as it became available, and were given the opportunity to voice their concerns and questions. Our telephones rang incessantly with questions from staff members concerned not only about themselves but also about the welfare of these critically ill patients. In many instances, questions concerning care of patients with this mysterious and fatal disease required individually tailored responses. Our staff team conferred daily with doctors and nurses as well as with patients in an attempt to enforce appropriate but not punitive precautions. In an effort to educate and reassure patients about isolation procedures, we helped develop and distribute informational patient pamphlets that explained not only the precautionary in-hospital procedures to be used but also the rationale for such procedures.

Nuclear Medicine Department

The department also conducted numerous educational programs for both professionals and non-professionals in the local community in an effort to quell media-provoked hysteria. Numerous medical, nursing and technical associations, as well as lay organizations, requested our services to provide information, answer questions and perhaps allay undue fears surrounding AIDS.

Finally, to evaluate scientifically the risk associated with exposure of employees to AIDS patients, we initiated a prospective study to examine the risk of nosocomial transmission of AIDS to health care personnel. The risk was found to be so small as to be currently unmeasurable.

Other significant HES activities during fiscal year 1985 included continuation of the hepatitis B immunization program in collaboration with the Department of Transfusion Medicine and the Occupational Medical Service.

In the space of only two years, Nuclear Medicine has been transformed from a quiet cul de sac in the ACRF to a bustling thoroughfare. Since early 1983, the department has a new chief, Dr. Steven Larson, and a new associate chief, Dr. Ronald Neumann, has increased its personnel roster from 40 to 57 positions, and has moved towards implementing major new collaborative research focused on positron emission tomography (PET), and the application of radiolabeled monoclonal antibodies to diagnostic imaging and immunotherapy.

With new equipment and extensive renovations underway to house both the new instruments and the increased staff, the department seems to be in constant motion. A three-story underground facility has been built beside the existing department to house two new atom-smashing cyclotrons, related shops, control rooms and labs for the purpose of rapidly producing short-lived radiopharmaceuticals to be used for PET studies.

PET was developed in the early 1970s when computer technology was combined with procedures using molecules labeled with radioisotopes that emit positrons (electrons that are positively charged). The radioactivity released during these procedures is detected by high-technology instrumentation and displayed to show an image of the organ being studied, usually the brain or the heart. The big advantage that PET offers over other imaging procedures is that the PET image reflects function of the organ, not just its anatomy. PET has been used at NIH to study glucose (sugar) metabolism in the brain, and the biochemical properties of brain tumors.

In 1985, 249 PET patient studies were performed. Once the cyclotrons are up and the PET scanners are in full swing, we anticipate an increase of almost 400% or an additional 950 such studies per year.

Given the imminent arrival of two state-of-the-art PET scanners, as well as the improved NeuroPET scanner built at NIH, three rooms in the department have been gutted and are being renovated into a suite that will give NIH one of the largest capacities for PET scanning in the world. Additional patient dosing rooms are being constructed, and a large room has been carved out of unused patient waiting space to house the department's cardiac nurses and nuclear medicine technologists. A film viewing room for physicians is to be built shortly. Another series of rooms is being merged into one large room to house a more powerful computer system capable of handling all the new data being generated both in

PET studies and the nuclear medicine clinic. Additional offices for 15 staff displaced by the above renovations have been constructed in what was formerly a waiting area for messengers and patient escorts. Another set of three offices has been converted to laboratories for monoclonal antibody research.

Radioactively labeled monoclonal antibodies first showed their potential in nuclear medicine about three years ago. An antibody is useful in directing the radionuclide to a specific location within the body because antibodies have a high affinity for certain molecules, their antigens. An antibody and its partner fit together chemically like two puzzle pieces. When a specific antigen is present in a pathological body tissue that physicians need to study, such as a tumor or damaged heart muscle, the labeled antibody that is the counterpart to that antigen will carry the radioactive agent to that tissue where it will bind. Standard nuclear medicine scans locate the radionuclide, and any abnormalities in the image may indicate an area of diseased tissue. With the labeled antibodies, diseased tissue is selectively highlighted. This provides more precise information on the exact location and extent of disease. The technique is also a good deal more sensitive than standard scans and offers the capability of highlighting very minute areas of diseased tissue.

Nursing Department

An even deeper role in clinical research characterized the activities of the Nursing Department in 1985. Though nurses here have traditionally supported research through clinical practice and patient advocacy, they are now more fully involved in all aspects of investigation. Today, nurses coordinate and manage protocols. They administer study medications, monitor responses, and participate in evaluation and followup. It is common nowadays for nurses to co-author scientific papers.

Every nursing service in the hospital participated in research projects during 1985. Examples include:

- Nurses in the Mental Health Clinic (NIMH) collaborated on several studies of personality and mood disorders. This included telephone and interview screening, psychological ratings, development of teaching plans and materials, and management of complex intravenous (IV) infusion studies. In addition, nurses provided individual and group therapy that have been vital in supporting patients through demanding protocols.
- The nurse in the dermatology clinic (NCI) collaborated in the management of several studies of rare skin disorders. Responsibilities included identification of patient and family education needs, the development of tools for this education, especially regarding Familial Basal Cell Nevus Syndrome. A nurse also managed much of the data collection and analysis and presented results.
- Nurses on 11 East and 11 West (NIAID) developed a program to teach patients with Wegener's disease standard ways to handle nasal irrigation. A nursing study is now being developed to test two methods of irrigation.
- The Endocrine Diagnostic and Provocative Testing Clinic (NICHD) is a nurse-run testing clinic that manages complex endocrine tests for outpatients. This program has enabled entire protocols to be moved off inpatient units into the clinic. More than 500 endocrine tests were performed in this two-day per week clinic this year.

Nurses are also collaborating on studies of breast cancer, precocious puberty, hepatitis, and allergies, and they were involved with new drug therapies for lung disease, rheumatoid arthritis and multiple sclerosis.

Growth and change in nursing have been especially visible in ambulatory care. With the ACRF moving toward full occupancy,

research protocols are being adapted and moved to the clinics. The outpatient setting is well suited to the development of efficient, nurse-run clinics. Nurses in the ambulatory care areas are committed to applying primary nursing values of professional accountability, an individualized approach to patients, and consistency in care in the management of patients in the ACRF.

Inpatient care, however, has not been slighted as ambulatory care has ascended. In September, the new 12 West patient care unit opened for cancer patients. Comprised of 14 beds for adults and four special laminar air flow rooms for bone marrow transplant patients, 12 West will provide care through a multidisciplinary team approach to patients from virtually every branch of NCI.

Since many protocols now require collaboration of several institutes and Clinical Center services for their completion, a number of inpatient units have been extraordinarily busy this year. Often a patient will be seen initially in ambulatory care, then proceed through several ancillary services, one or more inpatient units, the surgical service, and the intensive care area in the course of one study. This places special demands on primary nurses to maintain continuity of care. It also makes the educational and supportive needs of patients and families more complex.

The 13 East Medical Oncology Unit (NCI) continues to be a busy area. Many patients are followed throughout a long course of cancer treatment, remission and relapse, and many require complex management, especially during the terminal stages of illness. The 2 East and 2 J (Surgical Intensive Care) units are especially active as patients with advanced cancers undergo therapy with high doses of sophisticated new drugs. Although these patients require intensive nursing support, including complex discharge planning and emotional support, the response to the treatment seen in some patients has generated excitement and optimism among the staff.

In addition to clinical responsibilities, nurses engage in a variety of professional activities on a local, national and international scale. The Nursing Department organized and hosted four national conferences this year, including a National Clinical Nursing Conference on Alzheimer's Disease, the 11th Annual Nursing Research Symposium, and the Fourth Annual Computer Conference for Nursing.

There have also been significant professional developments within the department, most notably the implementation of the clinical ladder. This system provides a mechanism for recognition and advancement of nurses based on clinical excellence in caring for patients at the bedside. Critical care nurses received a special pay rate that has enabled the department to compete more effectively with area hospitals. Several specialty training programs, exchange programs and student affiliations have enabled a sharing of resources with universities and other research groups.

All activities have focused on improving the quality of professional nursing services offered by this department.

Nutrition Department

The Nutrition Department, one of the largest of the Clinical Center's 19 departments, provides nutritional care and food service of the highest quality to our patients. It also supports Institute protocols designed with a diet component and conducts research in clinical nutrition and food service management.

A two-week cycle offers 12 different menus modified to meet the needs of patients on a variety of diet prescriptions. The food choices offered on these menus reflect the dietary guidelines outlined in "Nutrition and Your Health," a collaborative publication of the Department of Health and Human Services and the Department of Agriculture.

All meals, snacks and supplemental feedings for patients are prepared in a main kitchen. Staffed with registered dietitians, supervisors, cooks, bakers and food service workers, the main kitchen operates 14 hours a day, seven days a week, to produce, assemble and serve an average of 26,000 meals a month at the patients' bedsides.

In addition to breakfast, lunch, and dinner, which are served at regularly scheduled times, the department serves a complete hot breakfast meal from 7:15 a.m. to 11 a.m. The extended hot breakfast service was implemented in 1985 to meet the needs of patients whose meals are delayed because of the numerous tests and procedures they must undergo. The department also provides an average of 260 meals to outpatients monthly.

The metabolic and laminar flow kitchens, also operated by the Nutrition Department, produce meals for metabolic balance studies (a method of investigating the metabolism of chemical elements or food constituents in a patient by determining the loss or retention of these substances in the body) and meals of a very low bacterial count, respectively.

A staff of registered dietitians, working as members of the medical team, assesses patients' needs for various levels of nutrition intervention and provides care based on the need identified. A patient with cancer, for example, might have a totally different diet from a patient with heart disease. All patients admitted to the hospital are assessed and a nutritional care plan prepared within 72 hours of admission. In 1985, direct patient care was increased almost nine percent, including nutritional assessment, provision of nutrition care, and research endeavors.

Outpatient Department

As more and more outpatients (148,000 in 1985) are seen in the hospital's Ambulatory Care Research Facility each year, the role of the Outpatient Department becomes even more crucial. Clinic days here can transform the ACRF into a version of Grand Central Station at rush hour. The Outpatient Department can be thought of as keeping the trains running on time.

In addition to the 45 clinics, the Outpatient Department is also responsible for Admissions, an Audiology Clinic, EKG, Echo and Stress laboratories, a Travel/Voucher office, and the Messenger and Escort Service.

This year, the National Institute of Neurological and Communicative Disorders and Stroke prepared to open up a new outpatient clinic on the fifth floor of the ACRF. The Outpatient Department worked closely with NINCDS staff and the Ambulatory Care Head Nurse to design the space and order necessary equipment, Centralizing a variety of NINCDS clinics into one area will allow expansion of other clinics where space is always at a premium.

Pharmacy Department

Helping guide outpatients and visitors through the Building 10 complex are members of the Messenger and Escort Service, which this year was contracted out to a private concern. This should result in better service for patients at all hours of the day and night.

So that it may hold a daily clinic, the National Institute on Alcohol Abuse and Alcoholism was relocated this year to the first floor. This involved much logistical effort. Changes in the way the National Cancer Institute's Medicine Branch clinics operate also required the help of department staff. Those employees who work hardest and accomplish the most in the Outpatient Department are eligible for a new award instituted this year—the Employee of the Quarter Award.

The Pharmacy Department provides comprehensive pharmaceutical services of the highest quality to patients and staff of the Clinical Center in support of biomedical research. This is done with a number of unique systems, services and programs.

Unit Dose System

Inpatients at the CC receive most medications by a "unit dose" distribution system. This system helps assure that each patient receives the correct dose of the correct drug at the correct time. Each dose is individually packaged, labeled, and protected from contamination up to the time it is taken. A 24-hour supply of unit dose medicines is placed in a drawer labeled with the patient's name and delivered to the nursing unit. The unit dose distribution system is the safest and most reliable way to give medications to inpatients. Approximately 1 million doses of medicine are dispensed by the Inpatient Pharmacy each year.

IV Admixture Service

Pharmacists working in the intravenous (IV) admixture unit mix all the medications that will be given directly into a vein (intravenously). Specially trained pharmacy personnel make these intravenous solutions under rigorous standards of sterility and quality control. The pharmacists ensure that all medications mixed in intravenous solutions do not interact and produce unfavorable effects. The solutions are made in clean-air cabinets called "laminar flow hoods." Laminar flow hoods filter particulate matter and bacteria in the air so that the solution will not be contaminated with potentially dangerous airborne material. The Inpatient Pharmacy mixes an average of 750 IV admixtures each day; however, there are peak days when the workload is in excess of 1,000 IV admixtures.

Outpatient Pharmacy

The Outpatient Pharmacy fills prescriptions for outpatients, patients on pass, and for those who are discharged. The pharmacists also counsel patients about the correct way to take medicines. It is important that medicine is taken properly because the success or failure of the treatment protocol depends on strict adherence to the directions of the prescribing doctor. The Outpatient Pharmacy also keeps extensive and detailed patient records so that every single dose of investigational drug is accounted for and the integrity of the customized drug therapy regimens is maintained. The Outpatient Pharmacy fills approximately 400 prescriptions per day. These normally represent a 3-6 month supply of drugs which have unusual labeling and packaging requirements. Prescriptions and investigational drugs are mailed to patients who are in long-term studies that don't require frequent followup visits.

Drug Research Studies

The department registers and controls all investigational drugs used for Clinical Center patients and provides a variety of services to assist doctors in their clinical studies. Research pharmacists take part in drug research studies by preparing new drugs in the correct form—tablet, capsule or injection—required by the protocol. This includes making "placebos" (inactive drug forms), special packaging and labeling. More than 2 million investigational drug units are formulated, manufactured and packaged each year. These pharmacists make sure that the drug stays potent during preparation and storage until it is administered. They also assist the doctor by keeping records on how much drug was administered or dispensed and when the drug was given. Such record keeping is necessary to comply with all state and Federal laws on investigational drugs. Research pharmacists also assist the doctor in selecting the correct dose by measuring and studying the drug in blood and urine samples to determine how the body handles the drug.

Clinical Pharmacy

Clinical Pharmacists are specialists who work in patient areas of the hospital participating in prescribing decisions, monitoring patient response to therapy, taking drug histories, keeping detailed records of drug usage and response, participating actively in the design of drug protocols and drug policies, and providing drug information to physicians, nurses and other health professionals. Clinical Pharmacists are assigned to the following patient care units: cardiology, mental health, oncology, neurology, and internal medicine. These pharmacists do not provide a product, that is, a drug. Rather, they provide a health service by developing, organizing, and distributing information and knowledge about drugs.

Drug Information

To help CC staff manage drug treatment, the Pharmacy Department operates a Drug Information Center that provides information to doctors, nurses, and other pharmacists both at the Clinical Center and at private hospitals. In this way, the department helps health professionals obtain the latest information on drug therapy and clinical pharmacology research.

The Pharmacy Department will, in the coming year, undergo extensive remodeling. The physical plant will be completely renovated and the pharmacy units will operate out of temporary quarters. During the past year, the department has designed both temporary quarters and a new, permanent facility. The CC will soon have a new pharmacy designed for pharmacy practice of the future and one of the most advanced Outpatient Pharmacies in the world.

In the past year, the department developed and designed a satellite pharmacy which will serve all inpatients on the oncology units. This will complement the existing outpatient oncology satellite located in the ACRF and will provide a comprehensive decentralized oncology service. Satellite pharmacies are beneficial when workload is high, drug therapy is complex, and a quick turnaround time for the receipt of drugs is vital.

Department of Rehabilitation Medicine

The Department of Rehabilitation Medicine supports the rehabilitation needs of all Institute patients. Its goals are to restore or maintain maximal functional level or, when possible, prevent functional decline.

In 1985, the department saw an increase in the number of requests for consultation and treatment. Patient visits climbed by 10% in all sections except Physical Therapy, where there was a decline of 2%. The department has also seen an increase in requests from Institute physicians in the area of protocol development. Functional assessments have been custom-designed for addition into 11 new protocols. Speech-swallow evaluation has been incorporated into three new protocols, and biomechanical assessments have been added to one.

During the past year, the department made significant progress in three areas: diagnosis and treatment of disorders occurring in the first phase of swallowing; development and application of methods to measure the effects of illness on life roles; and the design and evaluation of a new brace for the ankle.

Many patients seen at the Clinical Center suffer from swallowing difficulties, or "dysphagia." These are usually patients who have had stroke, dry mouth, or surgery for cancer of the head and neck. Up to now, these problems have been poorly understood because we have not been able to see what happens inside the mouth during the swallowing process. Now, using ultrasound imaging, we can visualize motions of the tongue, hyoid bone and palate during swallowing. We have determined the events that define the process and have shown that these can be adversely affected by specific diseases. We have begun to devise strategies for retraining people to compensate for these deficits.

As we successfully treat and occasionally cure some of our most dreaded diseases, we ask critical questions about the impact on life roles of diseases and treatments. Measurement of the effects of diseases and treatments on the family member, the worker and the student has been the focus of clinical activity in the department's Occupational Therapy Section. An activities record, designed to evaluate a day's activity, is being used to evaluate the relative usefulness of certain therapeutic interventions. We have devised a workbook, soon to be published, that teaches persons with arthritis how to plan their day and protect their joints from undue stress.

The Occupational Therapy Section has also evaluated the work and educational status of young persons who have survived serious childhood illness. These youngsters have lost time to hospitalization and may not have experimented with occupational and other choices in life. The information gathered by the department suggests interventions to maximize patients' functional status.

Control of ankle and foot pain is a major problem for many Americans. Millions of dollars are being spent on shoe inserts and foot surgery that may not produce the desired results. To evaluate the appropriateness and efficacy of inserts and braces, we must be able to measure changes in body alignment. Using an automated motion analysis system, we have been able to quantify gait parameters and measure ankle motion and forces around the ankle and knee joints. We have learned that for some kinds of foot and ankle pain, some currently prescribed braces are ineffective. One type, however, is highly effective in decreasing pain and restoring a high degree of functional independence. In fact, this type of ankle brace may make ankle surgery unnecessary. It is of particular significance to patients with rheumatoid arthritis involving the ankle.

Surgical Services Department

The Surgical Services Department provides personnel, space, equipment and administrative support for all hospital operating rooms in order to meet the surgical needs of the Institutes.

This year saw the opening of the Intraoperative Radiotherapy (IORT) operating room in the Radiation Department where cancer patients undergo a combined treatment of surgery and radiation therapy. Fifteen patients underwent intraoperative radiation in 1985. This treatment is designed to control the growth of tumors through delivery of higher doses of radiation than is possible by other radiotherapeutic techniques.

IORT is best suited to treat a variety of soft tissue sarcomas. These malignancies are often advanced when first recognized and are considered incurable by surgery alone. Patients have their tumors removed surgically and then the nearby tissues are irradiated before the incision is closed.

The department itself underwent a sort of transplant in 1985, changing from a Clinical Center service to a contract service of Georgetown University. Negotiations for this switch began in January 1985, and the contract went into effect in August. During this time, employees had many concerns---Will I have a job? What happens to my government retirement?, etc. Meetings were held with each staff member to answer questions and address these serious concerns. Each employee was guaranteed a job with the contractor or a transfer to another position in the hospital. In the end, the transition was completed smoothly.

Department of Transfusion Medicine

What's in a name? Visitors to the department this year may have been surprised to find the Blood Bank operating under a new name. By adopting the new designation of Department of Transfusion Medicine (DTM), we became the first blood bank in the world to signify the growth and importance of medical practice in the provision of blood services.

Since our beginning with only six people in 1952, the term "blood bank" has connoted a place to donate (deposit), store (bank), and distribute (withdraw) blood and blood products. In recent years, however, the banking analogy has captured only incompletely our increasing breadth of services and direct patient care responsibilities. Once viewed primarily as a laboratory and storage function, the provision of blood services as well as products has led to the recognition of transfusion medicine as a distinct subspecialty.

The last fiscal year has seen increases in the demand for most blood and blood components for transfusion. In 1985, whole blood and red blood cell transfusions increased by 8% over 1984 (8,888 to 9,677 units). A sharp 25% increase in platelet transfusions has had a significant impact on the department (16,000 to 21,300 units), and cryoprecipitate use also increased dramatically, from 195 units in 1984 to 1,163 units in 1985, representing an 84% increase. Granulocyte concentrate use remained constant, at approximately 100 units per year.

An encouraging 32% decline in the use of fresh frozen plasma, from 1,760 units in 1984 to 1,200 units in 1985, may be due in part to increased efforts of DTM physicians to encourage physicians to use NIH Consensus Conference guidelines for this product. DTM consultative services are also utilized when the blood product recipient experiences possible adverse reactions. Over 100 episodes were investigated in 1985, with approximately 80 documented transfusion reactions.

A primary goal of our organization is to support Institute medical research, which is partially accomplished by our provision of more than 1,600 collections of whole blood and 2,400 collections of buffy coats (white blood cells) for NIH investigators.

In addition to our continuing responsibility to supply blood products for clinical use and for research, the department now provides consultative medical and laboratory services in infectious disease prevention, treatment of hematologic disorders through apheresis (selective removal of blood components and return of unused products), evaluation of transfusion needs, and the association of blood-borne antigens with disease and transplantation.

Infectious Disease Prevention

This past year we introduced the new test to detect probable exposure of blood donors to the viral agent of acquired immunodeficiency syndrome (AIDS). Departmental experiments using chimpanzees were the first to show conclusively that infected blood products could transmit this virus, called human T-cell lymphotropic virus III (HTLV-III). With the development of a test detecting antibodies to HTLV-III as markers of exposure to the virus, the department immediately incorporated procedures for eliminating contaminated products from its daily inventory.

In addition, the Department of Transfusion Medicine is one of only two U.S. facilities to perform alanine aminotransferase (ALT) assays to exclude donations potentially infectious for non-A, non-B hepatitis. The laboratory continues surveillance for hepatitis B-contaminated products.

Apheresis

Apheresis procedures rose by more than 30% compared to last year, from 2,035 procedures to 2,853. In therapeutic apheresis, a component of blood, usually plasma, is removed by automated methods while the remaining components are returned to the patient. Diseases such as myasthenia gravis may be ameliorated, sometimes dramatically restoring muscle function to a virtually incapacitated patient, through removal of circulating antigen-antibody complexes. Apheresis is also essential in controlling massive water retention in patients undergoing experimental cancer therapy with otherwise toxic doses of biological growth inhibitors.

Therapeutic apheresis is one of the most exciting illustrations of the direct involvement of our staff in the practice of medicine. The same procedures applied to normal blood donors, however, are also important in collecting and preparing large volumes of platelets and disease-fighting granulocytes (white cells) from a single individual. Plateletpheresis and granulocytopheresis are, in fact, our primary methods of securing these important blood cellular components for patients whose own cell production has been impaired by chemotherapeutic treatment of leukemias and other cancers.

During 1985, the department proudly announced that all apheresis donors of products for transfusion are now unpaid volunteers. This achievement is largely due to the gifts of blood and time freely offered by NIH employees and other residents of the community. Their generosity is better appreciated when it is understood that the apheresis procedure requires one and one-half to one and three-quarters hours, exclusive of travel and registration time. And most encouraging of all, donations increased by 50% after the switch to a voluntary program.

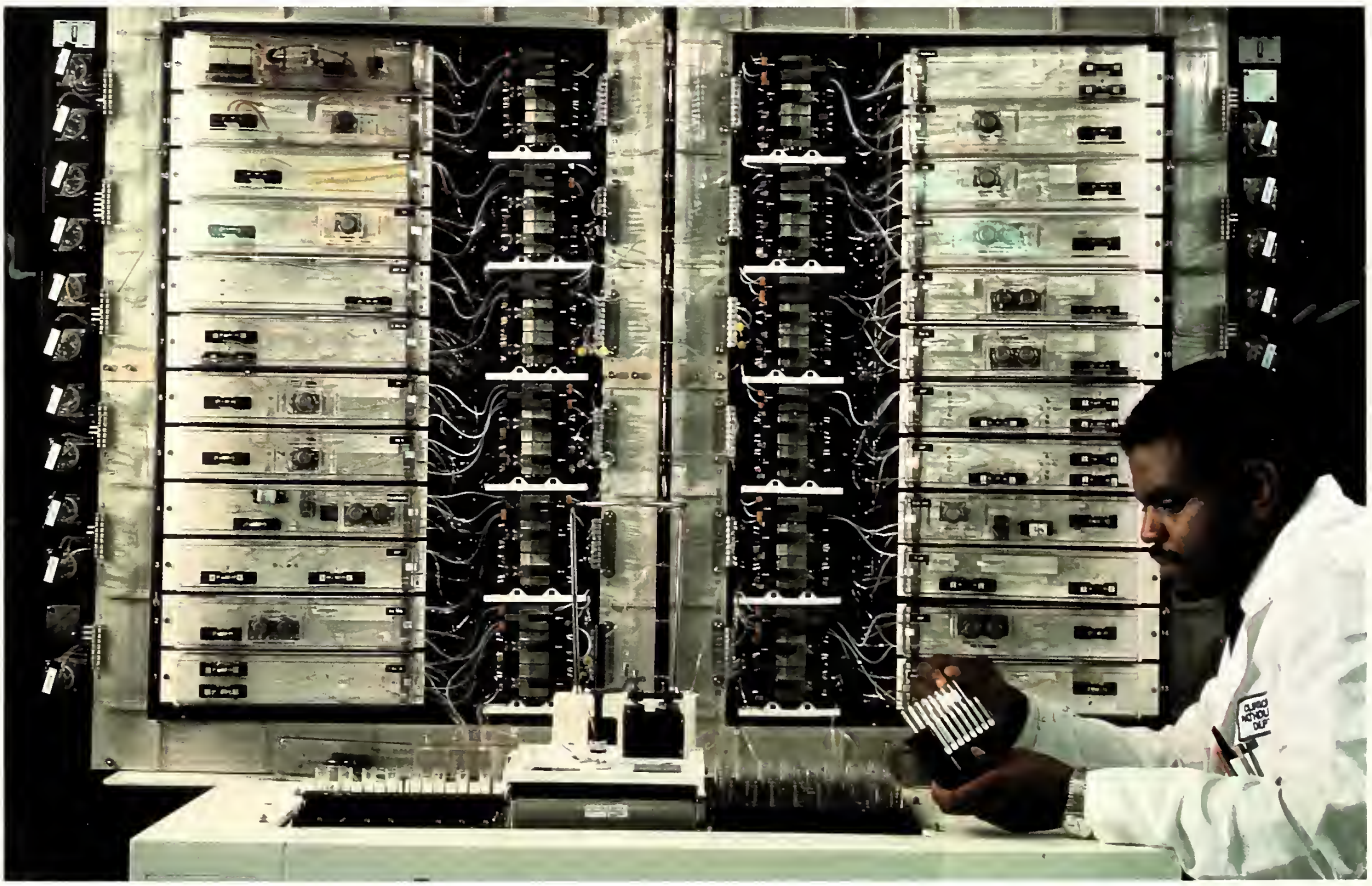
Education

The Department of Transfusion Medicine has been a training ground for physician specialists since its inception. Many prominent blood banking professionals received postgraduate medical training here as staff fellows. Today, the staff fellowship program enters one physician each year into a two-year program comprising service and research responsibilities and opportunities.

The Specialist in Blood Banking (SBB) training program was established in 1966. Many of its graduates are now technical supervisors, education coordinators or reference technologists at some of the nation's finest blood centers and transfusion services. The one-year program currently enrolls three students. Students who successfully complete the course are eligible to take the examinations for blood banking certification given by the American Association of Blood Banks.

In addition to weekly seminars for the department staff, each year the Department of Transfusion Medicine offers a one-day postgraduate seminar that draws several hundred participants from all over the country. This year the sessions will concentrate on recent advances in transfusion medicine and current application of blood component therapy.

Support Services



Building Services Manager

It is perhaps fitting in a place dedicated to the improvement of health that the building itself is continuously the object of therapies designed to improve its usefulness for patients and staff alike. The Building Services Office monitors all hospital construction and renovation projects. Considering that these activities are now either planned or currently underway from the roof (sun deck renovation) to the parking garage (refurbishment of cyclotron facility entrances), and on every floor in between, this is no small responsibility.

The Building Services Manager also works closely with the Clinical Center Maintenance Section to insure that the hospital is properly maintained and, above all, safe. Tests of emergency electrical power and fire safety inspections are routinely coordinated through this office. Last but not least, the Building Services Manager is an authority on space management in the hospital and is consulted whenever departments review their requirements for space.

Housekeeping and Fabric Care Department

The arrival and deployment of a sophisticated new washer/dryer run almost entirely by computer helped the Housekeeping and Fabric Care Department meet the challenge of an expanding patient census in the past year.

The new system enabled the department to process 1,185,000 pounds of laundry in 1985. This included 38,137 lab coats, 1,330 cook coats, 14,240 shirts and almost 20,000 pairs of pants. The sewing room also processed 35,120 patches, repairs and alterations.

The department is responsible for providing the safest possible sanitary environment for the Clinical Center and the Institutes which occupy it. This includes six miles of corridors and public space, 1,500 research laboratories, more than 500 patient rooms and hundreds of patient service rooms.

Often the nursing units cleaned by Housekeeping are extraordinarily active. The 12th floor ACRF clinic area, for example, normally requires coverage Monday through Friday from 6:30 a.m. until 9 p.m. for routine and special isolation cleaning. Project floor care—carpet cleaning, stripping floors, spray buffing—is scheduled for weekends and holidays. On this one unit alone, 76 hours a week are spent performing housekeeping duties. Workers spend almost 4,000 hours each year cleaning this floor. Other floors needing similar attention are 13, 12 and 3, which see a heavy volume of outpatients.

The department continues to support and encourage upward mobility for employees so they may work at their full potential. Employees spent more than 9,000 hours during FY 1985 in various training programs.

Information Systems Department

The Information Systems Department (ISD) was created two years ago to consolidate various Clinical Center computer activities including planning, development, operations and maintenance.

The department currently operates a computer center that provides round-the-clock service to all patient units, clinical pathology, pharmacy, radiology, admissions and other departments engaged in administrative, diagnostic and therapeutic activities.

In addition, ISD provides advice and support to all CC departments that have or are contemplating acquiring micro- or mini-computers, or other computer hardware and software.

ISD manages and operates the Clinical Center Medical Information System (CCMIS), a large "real-time" computerized system that provides access to patient records to retrieve and add data. Medical orders are entered directly by physicians or nursing personnel using video terminals that connect to a central computer. Patient information is displayed on video screens and printed for incorporation into the patient record.

CCMIS is used by more than 2,000 physicians, nurses and other clinical and administrative personnel. Each year, the Information Systems Department trains approximately 225 physicians, 275 nurses and 550 other personnel to use the system. There are more than 6,000 patient "biographical" records on file, and complete clinical records are retained on the system for all current patients. Each day there are 13,000 new entries made to patient records. During 1985, more than 1 million "medication given" records were recorded in the system and a like number of vital signs entries; more than 10 million pages of patient medical records were printed. The total patient information on disk files, available for instant retrieval, exceeds 1 billion characters.

To provide support to the wide range of users of CCMIS, the Information Systems Department maintains 20,000 screen display formats and hundreds of printout formats. Each year, ISD creates 5,000 new or revised screen formats and handles 40,000 phone calls related to CCMIS support and enhancement.

The past year saw a variety of enhancements to the data processing systems at the Clinical Center. Methods were developed to automate the collection of clinical research data, replacing handwritten records and transcriptions. CCMIS screens have been developed to automate data collection on patients in several special study areas including AIDS, genetics, and eye disease.

Also, several new software packages were installed that will enable ISD to provide better service to the departments. Plans are already underway to improve data processing, chiefly through the acquisition of new, more powerful computers. The future will also see investigators using their own personal computer-based work stations that will be able to access CCMIS.

Materiel Handling Department

Described by one of its employees as "the arms and legs of the CC," the Materiel Handling Department divides its staff of 85 into five sections to support the supply needs of Building 10 and all who dwell therein.

In addition to the Office of the Chief, the department is composed of the Hospital Administrative Services Section, the Receiving and Property Management Section, the Distribution Section, and the Central Hospital Supply Section. The Hospital Administrative Services Section is responsible for negotiating purchase of and buying all supplies and materials for the Materiel Handling and Surgery departments.

The Receiving Section receives all purchase orders for the Materiel Handling and Surgery departments and directs all others to their proper destinations. On a daily basis, this section directs approximately 40 companies making inside deliveries and 25 companies making deliveries only to the section's loading dock. Annually, this translates to approximately 10,440 direct deliveries inside the hospital and about 6,525 loading dock drop offs.

The Distribution Section receives, prepares and transports all items, orders, and equipment directly to their destinations. These items include medical/surgical supplies, chemicals, mail, and animal feed and bedding. The section uses both manual and automatic delivery systems to bring supplies to each floor and operates round-the-clock.

The Distribution Section also serves as a storage area for all in-house supplies maintained by the Central Hospital Supply (CHS) Section, which also has the responsibilities of decontamination, sterilization and reprocessing of equipment that can be reused. The CHS each month receives, fills, and delivers some 820 STAT requests and approximately 1,900 routine requests. Annually, almost 10,000 STAT requests, and 22,600 routine requests are handled, for a total of 32,600. The average order weighs from two to 20 pounds and costs about $3. CHS also replenishes 159 supply carts daily, each of which are worth about $850 and weigh 225 pounds. Proper items in proper places remains the goal of the department.

Medical Record Department

The history and development of medical records parallels that of medicine itself. Medical records are as necessary and valuable to the physician as blueprints are to the architect, and evidence of medical documentation dates back to about 25,000 B.C.

The earliest records were primitive and very different from those of today, but they served to document the practice of medicine and the advance of science. Whether early records were cave drawings, impressions imprinted on clay tablets, hieroglyphs painstakingly drawn in ancient tombs, or written treatises captured on papyrus or parchment, they serve as silent testimony to the value of recording observations and ideas for the use of future generations.

The Medical Record Department provides diversified support services for patients, physicians and other allied health personnel, which contribute to the overall effectiveness of care in the Clinical Center. The department must provide, on a timely basis, medical records for use in the diagnosis and treatment of patients, medical and scientific research, and medicolegal or administrative activity. To these ends, the medical record should serve as a dynamic mode of communication

contributing to continuity of medical care while allowing a continuous, auditable accounting of patient management and providing access to research data.

In order to assure the effectiveness of the medical record, the department must provide facilities and develop systems for the maintenance, analysis, storage and retrieval of medical records while preserving the integrity, privacy and legality of the information contained.

The scope of this effort can be appreciated by glancing at some figures for 1985. In the past year, staff in the Files Section pulled more than 75,000 medical records for patient care, 24,000 for research and filed over half a million individual medical reports into the records. The Medicolegal Section processed more than 10,000 requests for disclosure and dispatched more than 200,000 pages of medical information. Staff in the Record Processing Section performed approximately 34,000 medical record analyses and processed some 18,000 dictated medical reports.

Behind these huge numbers are people. It is the people who work here—the file clerks, medical record technicians, microfilm clerks, secretaries and records administrators—who continue to assure that the Medical Record Department provides the high quality services and personal attention expected at the Clinical Center.

Patient Activities Department

The Patient Activities Department provides a program of therapeutic recreation and library services to all patients and their families. In so doing, the department recognizes that meaningful recreation and leisure experiences are necessary for the physical, emotional and social well-being of all individuals, healthy or sick.

During the past year, the department has buttressed the clinical bases of its services to patients by strengthening its orientation toward therapeutic recreation principles and procedures. It has made major changes in patient assessments and treatment planning, documentation, and clinical reviews.

The department recently was restructured into patient care clusters—pediatrics, adult medical-surgical, neurology/psychiatry and adult general recreation. Newly instituted staff development sessions are aimed at enhancing professional development. The year's major emphases centered on elevating the therapeutic component of recreation as well as providing the important diversional recreation services.

Protection and Security in the Hospital

In January 1985, the Protection and Security Management Branch, Division of Safety, established a dedicated police unit to provide protective and security service to the Clinical Center. Thirty police officers and one security specialist were assigned to the Building 10/ACRF facility in order to staff seven post positions around the clock. A special orientation program was conducted by the management staff to introduce the police officers to staff members and to acquaint them with the many functions performed by the various hospital departments. The police officers were also honored at a reception following completion of the training sessions.

A philosophy of service has characterized the performance of the officers assigned to the Clinical Center. This has had significant impact. Their presence alone has increased the sense of security of CC employees. Observations made by the force have helped to reduce opportunities for crime that had been present before. The opportunity for close and continued interaction between officers and employees has served to build a better bond of trust. All of these factors have helped to contribute to a more than 20% reduction in theft within the Clinical Center in 1985.

Today, the CC is one of the safest hospital facilities in the Washington metropolitan area.

Much needs to be done in the future to continue to improve security in the CC. A foundation has been set in 1985 upon which we can enhance security in the years ahead. It has been documented that the combined efforts of our employees and NIH Police officers achieve positive results. Security is, after all, everyone's business.

Social Work Department

Unlike a community hospital, where patients are likely to have their support structure close at hand, the Clinical Center hosts patients from around the country and the world. It is therefore extremely important that the Social Work Department fill gaps in support for patients far from their traditional networks of aid and comfort.

The department provides its support services not only to all patients who come to the hospital, but to their families as well, offering ways to help restore, maintain and improve health. Its major priorities are mental health, discharge planning, crisis intervention, rehabilitation, community liaison and coping with the process of dying and death.

With knowledge of how psychological, social, and physical health factors may interact, social workers interpret individual responses to illness and hospitalization, and counsel accordingly. Clinical intervention helps each patient and family restore, sustain or improve strength for coping in the present and planning for the future. This year, almost 19,000 separate social work contacts were made, mostly with individual patients. With the opening of more outpatient clinics, even more contacts are expected in the coming years.

One of the most valued and visible aspects of the department is the Volunteer Services Program, a corps that represents one of the largest bodies of community members participating in Clinical Center patient care and family services. Volunteers offer personal and support services to smooth patient transition from the community to the hospital environment.

Staffed by a full-time director and more than 115 volunteers on a weekly basis, the program responds to requests for services with enthusiasm. These people perform a wide variety of duties in patient care, administrative and support service areas.

Youth and adult volunteers include individuals from career-oriented high school programs, colleges, universities, special interest groups, community agencies, paid staff and surrounding neighborhoods. They contribute between 2,100 and 2,300 hours each month.

This cadre of experienced and talented citizens brings to the hospital a wealth of knowledge. Volunteers can be credited with such contributions as translating the patient handbook, admissions documents and voucher program information into Spanish; providing daily mail delivery to all patients; escorting patients through the complicated maze of hospital corridors; helping out in offices that temporarily lack staff; and participating in most major patient recreational activities.

Through the continued effort of the Office of Volunteer Services and the Montgomery County Chapter of the American Red Cross, the Volunteer Services Program has completed its 24th year as an integral part of the hospital in providing comprehensive care to patients.

Department of Spiritual Ministry

The Department of Spiritual Ministry provides a full program of spiritual and religious ministry to Clinical Center patients and their families. There is a Protestant worship service on Sunday, daily Mass for Catholic patients, and a Moslem and a Jewish service on Friday, all held in the newly refurbished 14th floor Chapel.

The addition of two new Protestant chaplains—Revs. Rebecca Bentzinger and Gary Johnston—brought Chaplain LeRoy Kerney's department to full staff. Chaplains make bedside visits, including daily Holy Communion rounds for Catholic patients, to help patients and their families draw on their own faith and beliefs in the midst of illness and the strangeness of the hospital setting. Chaplains also visit outpatients in the clinics.

The chaplains consult and collaborate with hospital staff in other disciplines to coordinate patient needs. They serve on special committees to review ethical aspects of research protocols, attend team conferences in the Clinical Center, and work with religious organizations in the community.

The department is taking steps to recruit volunteers from local churches to help with its work and is laying the foundation to begin a Clinical Pastoral Education program for chaplains in training.

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